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Rec 10-3-77 H&K

1. CONTRACT (Proc. Inst. Ident.) NO. <b>EG-77-C-08-1524</b>	2. EFFECTIVE DATE <b>09-28-77</b>	3. REQUISITION/PURCHASE REQUEST/PROJECT NO. <b>G08-77-1045</b>	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING: <b>N/A</b>
5. ISSUED BY CODE <b>U. S. Energy Research &amp; Development Adm. Nevada Operations Office P. O. Box 14100 Las Vegas, Nevada 89114</b>		6. ADMINISTERED BY (If other than block 5) CODE	7. DELIVERY FOB DESTINATION <input checked="" type="checkbox"/> <b>OTHER (See below)</b>

8. CONTRACTOR NAME AND ADDRESS <b>Geothermal Power Corporation P. O. Box 1186 Novato, California 94947</b> <small>(Street, city, county, State, and ZIP code)</small>	9. DISCOUNT FOR PROMPT PAYMENT <b>N/A</b>	<div style="border: 2px solid black; padding: 5px; transform: rotate(-2deg);"> <p><b>THIS IS A COPY OF THE EXECUTED DOCUMENT</b></p> <p><b>CONTRACTS &amp; PROCUREMENT DIVISION</b></p> </div>
10. SUBMIT INVOICES (4 copies unless otherwise specified) TO ADDRESS SHOWN IN BLOCK <b>12</b> In duplicate		

11. SHIP TO/MARK FOR CODE <b>See attached "Schedule"</b>	12. PAYMENT WILL BE MADE BY CODE <b>U. S. Energy Research &amp; Development Adm. Finance Division P. O. Box 14100 Las Vegas, Nevada 89114</b>
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13. THIS PROCUREMENT WAS  ADVERTISED,  NEGOTIATED, PURSUANT TO:  
 10 U.S.C. 2304 (a) ( )  
 41 U.S.C. 252 (c) **10**

14. ACCOUNTING AND APPROPRIATION DATA

15. ITEM NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	This Contract EG-77-C-08-1524 consists of (1) Schedule (2) Appendix A, General Contract Provisions (3) Appendix B, Intellectual Property Clauses and (4) Appendix C, Schedule of Phases; all as attached hereto and made a part hereof.				

21. TOTAL AMOUNT OF CONTRACT **\$710,468**  
 CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. <input checked="" type="checkbox"/> CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return <u>2</u> copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)	26. <input type="checkbox"/> AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____, including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.
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23. NAME OF CONTRACTOR BY <b>Frank G. Metcalfe, President</b> <small>(Signature of person authorized to sign)</small>	27. UNITED STATES OF AMERICA BY <b>[Signature]</b> <small>(Signature of Contracting Officer)</small>
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24. NAME AND TITLE OF SIGNER (Type or print) <b>FRANK G. METCALFE PRESIDENT</b>	25. DATE SIGNED <b>9/26/77</b>	28. NAME OF CONTRACTING OFFICER (Type or print) <b>Robert W. Taft, Assistant Manager for Plans, Engineering &amp; Budgets</b>	29. DATE SIGNED <b>9/26/77</b>
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DRAFT  
Cotter  
9/9/77

GEOHERMAL POWER COMPANY

STATEMENT OF WORK

The Contractor will use its best effort to conduct a geothermal resource exploration on its lease holdings in Beaver Country, Utah and will provide to the Government data it has acquired or will acquire as set forth in its response to the ERDA, Request for Proposal dated March 25, 1977, including Amendment No. 1 and as specifically stated in the Article \_\_\_\_\_ entitled "Deliverables."

The Contractor program of exploration includes the phases as described below, with the execution of succeeding phases dependent upon the experience, results and evaluation of the preceding phases.

The Contractor shall provide to the Government <sup>5x (6)</sup> ~~the required number of~~ copies of <sup>all</sup> data ~~acquired~~ in accordance with Article entitled "Deliverables".

In the event any or part of the data to be provided is not available by reasons of technical difficulties beyond the control of the Contractor or for any other reason including reason within the control of the Contractor an appropriate reduction will be made in the amount otherwise due for <sup>at</sup> the phase.

The proposed program for which the Government agrees to pay the unit prices as stated in Article ~~entitled~~ "Payment" shall be as follows:

Phase I, Shallow Thermal Gradient Holes

Drill approximately fifteen heat gradient holes to depth of approximately 300' to <sup>5</sup>400' each, log each hole to obtain temperature

data and calculate heat flow. Total estimated accumulated depth, surface ground level to total depth is 5,000 feet.

Phase II, Deep Thermal Gradient Hole Observation Hole No. 1

Drill and complete an observation hole to an approximate total depth of 2,000 ft. Work to be performed and data to be acquired shall include but not be limited to mud logging from the shoe of 10 3/4-inch casing, drill cutting sample collection every 5 feet, angle survey and maximum temperature taken approximate every 200 feet, continuously recorded "in" and "out" circulating mud temperatures, lithology and drilling rates, pit level recordings, and logging (Induction Sonic, Density and Temperature).

~~Your~~ Upon completion of Phase II, the Contractor may elect to proceed with Phase III or Phase IV. Should the Contractor elect to proceed with Phase IV, it may perform Phase III at any time during the contract term.

Phase III, Deep Thermal Gradient Hole Observation Hole No. 2

Drill and complete an observation hole to an approximate total depth of 2,000 feet. Work to be performed and data to be acquired shall include but not be limited to mud logging from the shoe of 10 3/4-inch casing, drill cutting sample collection every 5 feet, angle survey and maximum temperature taken approximate every 200 feet, continuously recorded "in" and "out" circulating mud temperatures, lithology and drilling rates, pit level recordings, and logging (Induction Sonic, Density and Temperature).

Phase IV, Exploratory Production Well No. 1

Drill and complete an exploratory production well to an approximate total depth of 7,000 feet. Work to be performed shall and data to be acquired include but <sup>is</sup> not be limited to mud logging from the shoe of the 20-inch conductor pipe, continuous monitoring of "in" and "out" temperatures of the circulating mud, H<sub>2</sub><sup>S</sup> and CH<sub>4</sub> monitoring, lithology and drilling rates, pit level recordings, surveying hole angle and run maximum recording thermometer at trips for new bits, logging (induction, sonic, temperature and density), collecting cutting samples and taking conventional cores, if appropriate.

Phase V, Exploratory Production Well No. 2

Drill and complete an exploratory production well to an approximate total depth of 7,000 feet. Work to be performed shall and data to be acquired include but <sup>is</sup> not be limited to mud logging from the shoe of the 20-inch conductor pipe, continuous monitoring of "in" and "out" temperatures of the circulating mud, H<sub>2</sub><sup>S</sup> and CH<sub>4</sub> monitoring, lithology and drilling rates, pit level recordings, surveying hole angle and run maximum recording thermometer at trips for new bits, logging (induction, sonic, temperature and density), collecting cutting samples and taking conventional cores, if appropriate.

Phase VI, Exploratory Production Well No. 3

Drill and complete an exploratory production well to an approximate total depth of 7,000 feet. Work to be performed shall and data to be

acquired includes <sup>is</sup> but not be limited to mud logging from the shoe of the 20-inch conductor pipe, continuous monitoring of "in" and "out" temperatures of the circulating mud, H<sub>2</sub>S<sup>s</sup> and CH<sub>4</sub> monitoring, lithology and drilling rates, pit level recordings, surveying of hole angle and running maximum recording thermometer at trips for new bits, logging (induction, sonic, temperature and density), collecting cutting samples and taking conventional cores, if appropriate.

~~GEOHERMAL POWER~~

Article - Deliverables

- 2.
- A. Definition: Data shall mean recorded information, regardless of form or character, of a scientific or technical nature. It shall include, but not be limited to surveys, maps, charts, displays, analyses, evaluation, studies and environmental evaluations.
- B. Data Delivery Schedule: Six copies of all "data" as defined above and core, cuttings and fluid samples as hereinafter stated shall be provided by the Contractor to ERDA in general accordance with the delivery schedule categories as shown below. The number assigned to each deliverable shown under Section C, Deliverable Data below corresponds to the Data Delivery Category as follows:
- (1) Data provided within one month after completion of Phase, or other investigations.

- (2) Data provided within three months after completion of investigation Phase.
- (3) Delivery to be taken by ERDA or University of Utah representative at location or shipped to University of Utah if directed by Contracting Officer.

C. Deliverable Data: Data to be furnished by the Contractor resulting from prior investigations and the execution of its program as set forth in the Article \_\_\_\_\_, Statement of Work, shall include but not be limited to the following:

- 1. Phase I - Shallow Thermal Gradient Holes Data, from all holes and Consultant's Report;
  - a. (2) Temperature logging and heat flow calculations
  - b. (2) Report of heat gradient hole investigations
  - c. (2) Drill cutting samples (washed and dried)
  - d. (2) GeothermEx Report, January 1977, "Geothermal Potential of Lands Leased by Geothermal Power Corporation in the Mineral Mountains, Beaver and Millard Counties, Utah"
- 2. Phases II and III, Deep Thermal Gradient Observation Holes Data, from each well;

- a. (2) Drilling history, including bit records, circulating mud temperatures (in and out), hole angle surveys, and maximum thermometer readings, drilling fluid experience, H<sub>2</sub>S and CH<sub>4</sub> records, and "as drilled and abandoned" well drawings;
  - b. (1) Mud logging reports and lithology charts
  - c. (1) Formation evaluation logs
  - d. (1) Auxiliary logs, if taken
  - e. (2) Formation fluid analyses
  - f. (2) Flow testing records
  - g. (3) Drilling cutting, every 5 feet (washed, dried and identified)
  - h. (3) Core, if taken (portion to be determined upon core recovery with ERDA or University of Utah representative)
  - i. (3) Formations fluid samples, if recovered (container to be furnished by ERDA)
  - j. (2) Well Summary Report (interpretation and analysis)
3. Phase IV, V and VI - Exploratory Production Wells Data, from each well



- a. (2) Drilling history, including bit records, circulating mud temperatures (in and out), hole angle surveys, and maximum thermometer readings, drilling fluid experience, H<sub>2</sub>S and CH<sub>4</sub> records, and "as drilled" well drawings;
  - b. (1) Mud logging reports and lithology charts
  - c. (1) Formation evaluation logs
  - d. (1) Auxiliary logs
  - e. (2) Formation fluid analyses
  - f. (2) Flow testing records
  - g. (3) Drilling cutting, every 10 feet above 1800 feet depth and every 5 feet below 1800 feet depth (washed, dried and identified)
  - h. (3) Core, if taken (portion to be determined upon core recovery with ERDA or University of Utah representative)
  - i. (3) Formation fluid samples, if recovered (container to be furnished by ERDA)
  - j. (2) Well Summary Report (interpretation and analysis)
4. (1) Production Testing

In addition to the data set forth above, the Contractor agrees to submit to ERDA any additional data it may derive from the

drilling of injection well(s) and/or from production flow tests it may undertake as a result of concluding any of the above Phases, including the sharing of reservoir production fluid samples, all at no additional cost to the Government. Provided, however that the Contractor shall not be obligated to submit progress reports or a final report except as required during Phases I through VI.

Article - Reporting Instructions

A. Field Work Status Report

During those Phases where field activity is in progress the Contractor will keep the ERDA/NV representative advised of the status of the work by brief informal daily reports, particularly advising when scheduling coring or fluid sampling.

B. Monthly Technical Progress Report

A monthly Technical Progress Report shall be prepared by the Contractor and six copies submitted to ERDA within 15 days after the month end.

This will be a letter typed report briefly describing activities during the past month, significant problems encountered, proposed solutions to the problems, and activities planned for the coming month. The copies shall be furnished in accordance with Article - Data and Report Distribution.

C. Reports for Dissemination

The Consultant's Report (GeothermEx, January 1977, see Deliverable Data, Phase I.d.) and the Well Summary Reports (Deliverable Data, Phase II through VI, J.) have been designated for dissemination to the public through the ERDA Technical Information Center (TIC).

These Reports shall be submitted as setforth in Article - Deliverables. The ERDA 76/72 Requirements and Procedures for Reporting Geothermal Information shall apply as outlined in its Section II and III. The ERDA Technical Information Center (TIC) will duplicate and distribute reports as indicated in Section IV C, D, and E of the Procedures, and distribution will be in Category UC-66a, and will be so indicated on the Report title page.

Copies shall be furnished in accordance with Article - Data and Report Distribution.

Article - Data and Report Distribution.

Six copies of all Deliverable Data and Reports shall be furnished by the Contractor of which two copies each shall be submitted to the following individuals and offices:

Dr. John W. Salisbury  
Division of Geothermal Energy - M/A 31220  
U.S. Energy Research and Development Administration  
20 Massachusetts Ave.  
Washington, DC 20545

Contracting Officer  
U. S. Energy Research and Development Administration  
Nevada Operations Office  
P. O. Box 14100  
Las Vegas, NV 89114

Dr. Howard Ross  
Earth Sciences Laboratory  
University of Utah Research <sup>Arch</sup> Institute, Research Park, 391 Chipeta Way  
~~State~~  
Salt Lake City, UT 84108